IN THE CLAIMS:

1. (Currently Amended) An ultrasound image focusing method, comprising the ~~phases~~ steps of:

sending to a volume being investigated a series of excitation ultrasonic signals, through an array of transducers aligned in a transverse direction (x), said ultrasonic signals propagating in depth in said volume according to a direction of propagation (y);

acquiring, through said transducers, signals reflected from at least one reflector ~~reflectors~~ located in the volume being investigated, said signals defining a curve in a spatial domain (x, y), defined by said transverse direction (x) and by said direction of propagation (y);

performing on said reflected signals a transform in the transverse direction from ~~a~~ said spatial domain ~~(x,y), defined by said transverse direction (x) and by said direction of propagation (y);~~ to a first transformed domain;

applying, in the transformed domain, a two-dimensional transformation, to straighten said curve ~~every curved image~~ (Ip1, Ip2, Ip3) of ~~a~~ said at least one reflector in said volume being investigated and make it essentially orthogonal to the direction of propagation (y);

compressing ~~each~~ said straightened curve (Im1, Im2, Im3) in the transverse direction (x) to generate a compressed signal by concentrating ~~concentrate~~ said straightened ~~image~~ curve in a zone centered at the level of the position of said reflector along said transverse direction (x).

2. (Original) Method as claimed in claim 1, wherein the signals acquired are subjected

to coherent demodulation of the signal to return it to the base band.

3. (Currently Amended) Method as claimed in claim 1, wherein said transform in said transverse direction is a Fourier transform ~~in the transverse direction (x)~~.

4. (Currently Amended) Method as claimed in claim ~~1~~ 15, wherein said inverse transform ~~transverse compression of said straightened curves~~ is completed with gain and phase compensation ~~and with an inverse transform, which returns the image from the frequency domain to the spatial domain~~.

5. (Original) Method as claimed in claim 1, wherein said two-dimensional transformation is expressed by:

$$\begin{cases} \overline{\omega}_x = \omega_x \\ \overline{y} = y\sqrt{1 - \dfrac{\omega_x^2}{4k^2}} \end{cases}$$

where ω_x is the coordinate in the direction of the frequencies

k is the propagation constant equal to $2\pi/\lambda$

and λ is the wavelength of the ultrasonic signal transmitted.

6. (Original) Method as claimed in claim 1, wherein said excitation ultrasonic signals are frequency modulated.

7. (Original) Method as claimed in claim 6, wherein said frequency modulation is a linear modulation.

8. (Currently Amended) Method as claimed in ~~claim 6~~ claim 1, wherein said excitation ultrasonic signals have a rectangular envelope.

9. (Currently Amended) Method as claimed in claim ~~6~~ 1, wherein the signals reflected from said reflectors are returned to base band by means of coherent demodulation.

10. (Currently Amended) Method as claimed in claim ~~6~~ 1, wherein the signals reflected from said reflectors in the volume being investigated are compressed in the direction of propagation (y).

11. (Original) Method as claimed in claim 10, wherein said reflected signals are compressed in the direction of propagation by means of a transform in the direction of propagation (y), from the spatial domain to a frequency domain (x, ω_y), phase and gain compensation and a subsequent inverse transform.

12. (Original) Method as claimed in claim 11, wherein said transform in the direction of propagation is a Fourier transform.

13. (Original) Method as claimed in claim 1, wherein said excitation ultrasonic signals are sent to said volume being investigated in sequence from single transducers or from groups comprising a limited number of transducers, and wherein the image of the volume being investigated is obtained by acquiring in sequence, for each signal sent by each single transducer or each group of transducers, the signals reflected from said reflectors and acquired by the transducer or by the group of transducers that emitted the relative signal sent.

14. (Original) An ultrasound system comprising at least a probe with an array of transducers aligned in a transverse direction of alignment, means to excite said transducers in sequence, processing means to receive and process signals reflected from reflectors contained in a volume being investigated in which ultrasonic signals generated by said transducers are propagated, said processing means performing transverse focusing of the ultrasound signal received by said transducers with a method according to one or more of the previous claims.

15. (New) A method in accordance with claim 1, further comprising:

performing an inverse transformation of said compressed signal from a frequency domain to said spatial domain.

16. (New) A method for focusing ultrasound waves from an object, the method comprising the steps of:

providing an array of transducers aligned in a transverse direction (x);

sending a series of ultrasonic excitation signals from said array of transducers into the object in a propagation direction (y);

acquiring from said transducers, reflected signals reflected from any reflectors arranged in the object;

performing a transverse transformation on said reflected signals in said transverse direction from a spatial domain (x,y), defined by said transverse direction (x) and by said propagation direction (y), to a transformed domain, said reflected signals in said transformed domain being transverse transformed signals;

performing a two-dimensional transformation on said transverse transformed signals to straighten every curved line in said transverse transformed signals representing a reflector in the object, said two-dimensional transformation straightening each said curved line in a direction substantially orthogonal to said propagation direction (y) to form a straightened line;

compressing, in said transverse direction (x), each said straightened line to concentrate said each straightened line in a zone centered at a position of a respective reflector along said transverse direction (x), said compressing forming a compressed signal.

17. (New) A method in accordance with claim 16, wherein:

said transverse transformation produces a curved line in said transverse transformed

signals for each of any reflectors in the object.

18. (New) A method in accordance with claim 16, wherein:

said transverse transform is a Fourier transform in said transverse direction (x).

19. (New) A method in accordance with claim 16, further comprising:

performing an inverse transformation of said compressed signal from a frequency domain to said spatial domain.

20. (New) A method in accordance with claim 19, wherein:

said inverse transformation includes gain and phase compensation.